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Strategies for Preventing Milk Fever in Dairy Cattle

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Milk fever is a complex metabolic disorder that occurs at the onset of lactation. Clinical symptoms of this disease include inappetence, tetany, inhibition of urination and defecation, lateral recumbency, and eventual coma and death if left untreated. The hallmark of this disease is severe hypocalcemia, which probably accounts for most of the clinical signs associated with a milk fever episode. Several factors have been consistently associated with increased incidence of milk fever, including parturition and initiation of lactation, advancing age, breed, and diet. Of the various methods used in attempts to control the disease, the most progress has been made in dietary management. Until recently, most attention has focused on manipulating the levels of dietary calcium to control milk fever incidence; results, however, have been inconsistent, except for those diets containing very low (8 to 10 g/d) concentrations of Ca. During the past decade, there has been renewed interest and research in the use of dietary anions (Cl^- and SO_4^{2-}) in controlling milk fever. An outgrowth of this research has been the surprising realization that dietary K is significant (perhaps more significant than Ca) in determining the susceptibility of dairy cows to milk fever. This knowledge has expanded the understanding of the pathogenesis of milk fever and has focused attention on research designed to study methods for neutralizing the detrimental effects of dietary K excess on periparturient animal health. This report discusses various practical strategies and potential research areas for managing the dietary forage components to minimize the effects of K on milk fever incidence.

Key Words: milk fever • hypocalcemia • potassium • cation-anion difference

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[Abstract] [Full Text] [PDF]

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[Abstract] [Full Text] [PDF]

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[Abstract] [Full Text] [PDF]

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[Abstract] [Full Text] [PDF]

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Altering Dietary Cation-Anion Difference in Lactating Dairy Cows to Reduce Phosphorus Excretion to the Environment
J Dairy Sci, June 1, 2004; 87(6): 1751 - 1757.
[Abstract] [Full Text] [PDF]

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Influence of Transition Diets on Occurrence of Subclinical Laminitis in Holstein Dairy Cows
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[Abstract] [Full Text] [PDF]

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[Abstract] [Full Text] [PDF]
